

The book suffers from want of compression, and there are some repetitions. The long chapters on the geographical aspects of the problem serve rather to show how little help must be expected from that line of inquiry until much more minute treatment can be applied. No one supposes that any fresh lesson of importance is to be derived from the broad facts of geographical distribution, and the deductions that have been already drawn could, in so far as they are of consequence, be amply stated in half a dozen pages. On the other hand, as to the more interesting phenomena of geographical inter-relationship, the problems, for instance, of intergrading species, too little is said. In a text-book of this scope it would have been well to direct the attention of students to the necessity for thorough study of facts of this class, a field in which there is room for much analytical research.

There is one rather serious omission. The phenomena of regeneration and the mechanics of development are among the most obscure with which a theory of descent has to cope. In the minds of many evolutionists, the existence of those strange and specific powers of response to injury which modern research has revealed constitutes a formidable problem, and though for its solution we still wait, the facts should have been stated.

In dealing with matters of opinion, Prof. Lotsy shows good judgment and critical power. This is especially manifested in his discussion of adaptation, of the evidence for mutation, and of the assertions by which an attempt has been made to revive Lamarckian views. Sometimes, perhaps, one is conscious of an exaggerated patience. Conventional arguments which the author plainly recognises as bad are repeated out of deference to their originators. The expert is not in doubt as to his real opinion, but the lay reader will carry away the impression that decided questions are still open. When he deals with the writings of Wallace, indeed, he allows himself the remark that this is "*Selectionstheorie à outrance*," but such freedom of expression is rare.

The author gives a full but somewhat non-committal account of the views of Eimer, and discusses the relation of Nägeli to the conception of orthogenesis as a main factor in evolution. Yet, after reading all that is said on this question, it is not easy to seize the exact point which is relied on as a proof of the reality of orthogenesis. The adaptation may be very perfect, and selection of indeterminate variations an unpromising account of the origin of that perfection, but it will never do to attribute this wonderful power of orthogenetic variation to organisms simply because we do not see how they could have become what they are without it. This, apparently, is Prof. Lotsy's view also, but many would have been glad of a more definite lead.

If the book reaches a second edition, as it probably will, the question of reducing it to two-thirds its present size should be considered. In that event also the proofs should be submitted to a professional proof-reader, for in this second part, as in the first, the abundance of typographical slips exceeds all reasonable limits.

W. BATESON.

METALLOGRAPHY.

Introduction to Metallography. By Dr. Paul Goerens. Translated by Fred Ibbotson. Pp. x+214; illustrated. (London: Longmans, Green and Co., 1908.) Price 7s. 6d. net.

ALTHOUGH metallography is a very young science, a number of little books on it have already made their appearance, and of these Dr. Goerens's "*Einführung in die Metallographie*" is not the least successful. The author says in his preface that before the publication of his work the numerous papers on the subject had not undergone systematic collection in Germany. If it is not the only book in this country, it is nevertheless welcome, and Mr. Ibbotson's excellent translation greatly increases its usefulness.

Alloys can be studied in several ways, of which the most important have been found to be the preparation of their cooling curves and the examination of polished and etched specimens under the microscope. The whole book is devoted to these two methods, and no reference is made to the electric and heat conductivity of metals and alloys, to their density, hardness, malleability, ductility, colour, resistance to shock, &c. No doubt this is due to the small amount of systematic investigation that has been devoted to these properties, but when a complete work on metallography is written these points cannot be entirely ignored.

However, the preparation of cooling curves by the use of thermocouples is adequately described by the author, and the various means of detecting critical points explained clearly. There is not much discussion of pyrometers, and the platinum resistance pyrometer, with which Heycock and Neville did their classical work, is not mentioned, presumably because it is not much used in Germany.

Physical mixtures, or bodies of perfectly uniform composition not governed by the laws of valency, are divided by Dr. Goerens into aqueous solutions, fused salts and alloys. He defends this use of the historical method on account of its expediency, observing that the reader will find out for himself as he proceeds that the division is arbitrary. The author, however, soon reaches the alloys, and thereafter for seventy-five pages gives a valuable account of the existing views on their constitution. This part is illustrated by descriptions of a number of series of binary alloys drawn from work on cooling curves done in England, Germany, and France, and the references are numerous and accurate. So many examples are given in each subdivision that it is a pity that here at least completeness was not attempted by including all the binary alloys which have been worked out. The additional space required in a second edition would not be great, and the author would produce a book of reference without destroying its usefulness as an introductory volume for students. There seems no reason to exclude even the mixtures of metals with oxygen, sulphur, arsenic, &c., many of which have been studied by Friedrich. These series of bodies are of

higher importance to smelters than the alloys proper, and have been shown to obey the same laws when they are fused and allowed to cool.

The remainder of the book is devoted to the practical microscopy of metals and to an excellent and sufficiently full description of the iron-carbon alloys. The section is entitled "The Special Metallography of Iron and its Alloys," but no mention is made of any alloy of iron except those with carbon, so that for information as to all the special steels, which are now of so much interest, the reader must wait for another edition or another book.

Enough has been said to show that the standard work on metallography is yet to be written, but that students will find Dr. Goerens's book admirable as affording them a glimpse of the methods of investigating metals and alloys. T. K. R.

ELECTRO-THERAPEUTICS.

Röntgen Rays and Electro-therapeutics, with Chapters on Radium and Phototherapy. By Dr. M. K. Kassabian. Lippincott's New Medical Series. Pp. 545. (Philadelphia and London: J. B. Lippincott Co., n.d.) Price 15s. net.

WITHIN the last ten years the study of electro-therapeutics has rapidly grown, and, indeed, the progress has been so great that it is almost impossible for any author to record the constant advances published from day to day. Many valuable and important works have been published upon this subject, and when stating this, Dr. Kassabian says he wishes to present to his readers, clearly and concisely, the more important facts pertaining to electro-therapeutics and Röntgen rays.

The book begins with a general introduction, and considers the use of electricity in the medical curriculum. The following chapters are devoted to the nature and properties of magnetism and electricity, to different methods of producing electrical energy, and it should be said the apparatus required for the different forms have been very fully entered into. The next part of the work is devoted to pathological conditions in general diseases and special departments.

High frequency and, above all, as the title indicates, Röntgen rays occupy a very large part of the book, and the technique has been very carefully gone into. Though treating of this subject generally, the application of X-rays for diagnosis and treatment is fully described, and three chapters are devoted to the study of radium and phototherapy.

It will be seen from the very large number of subjects introduced that it must be a very difficult thing for any author to do justice to all in one volume. It can be said, however, that any student of electro-therapeutics carefully reading this book will find in it a valuable aid, and any practitioner desirous of obtaining an excellent general view of the subject will do well to obtain a copy. There can be no doubt whatever that the scope of the work has been carefully thought out, the descriptions and instructions are clear and concise, and Dr. Kassabian deserves to be congratulated heartily upon the general result. In

addition to the printed matter, there are no fewer than 245 illustrations, many of them of great value, and all of considerable service to the student.

We have hinted in the above statement that the subject is so vast that it is difficult to do justice to every department, and the author seems to be conscious of this, because he admits that the space is all too brief for the study of phototherapy. The same might be said of the attention paid to the physiological effects of high-frequency currents. All the same, Dr. Kassabian has exercised a wise discretion, because in some parts of the book, such as the dosage of X-rays—a vexed question, and yet one of vital importance to the profession—he has given an excellent *résumé* of what has been done.

Now and again the author might confuse a beginner for want of a slight explanation; for example, at one time he points out (p. 448) that the X-rays may produce pigmentation of the skin, and, again, he quotes the case of a brunette losing pigmentation by the same agent.

The index, although excellent, might be improved. For example, "hypertrichosis" and "naevus" will not be found under the initial letter of each word, but under "X-rays" in these affections. Other examples might be quoted.

OUR BOOK SHELF.

On the Plantation, Cultivation and Curing of Para India-rubber (Hevea brasiliensis), with an Account of its Introduction from the West to the Eastern Tropics. By H. A. Wickham. Pp. iv+78. (London: Kegan Paul, Trench, Trübner and Co., Ltd., 1908.) Price 3s. 6d. net.

MR. H. A. WICKHAM re-tells the interesting story of the successful effort of the Government of India with the aid of the Royal Gardens, Kew, to introduce the Para rubber tree (*Hevea brasiliensis*) from Brazil to the eastern tropics. Though the tale, at least in outline, is fairly familiar, it is one that bears repeating, and as told by Mr. Wickham will, in spite of a certain ruggedness of style, be read with interest, since it has the advantage of being from the pen of one who can say with truth of the history he relates, *pars magna fui*.

The passages in which Mr. Wickham strives to impress on his readers his experience that the Para rubber tree is properly a denizen of the immense forest-clad plains which occupy the areas between the great rivers of the Amazon system will attract attention. These plains are considerably more elevated than the flat ground which skirts the banks of the actual rivers, and is periodically inundated when the rivers rise. The tree does, indeed, occur on these low-lying tracts, but in Mr. Wickham's experience it does not thrive so well on these flooded levels as on the somewhat higher plateaux that abut upon them. The question is of interest because of the practical bearing it may have on the treatment of *Hevea brasiliensis* as a cultivated tree.

The discussion of the methods that, in the opinion of Mr. Wickham, are most suitable for the cultivation of the tree and the treatment of its latex will also be read with interest by those engaged in both occupations. The literature of the subject is already extensive, and much of it is of high quality. But what Mr. Wickham has to say will receive the attention of those practically interested in *Hevea* as coming from